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Sensitivity of Northern Hemisphere Surface Climate to Millennial Solar Forcing

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The sensitivity of the Northern Hemisphere surface climate to periodic millennial solar forcing was investigated with the Kiel Climate Model (KCM). The level of the decadal to centennial Northern Hemisphere surface air temperature variability in both the experiment with time-varying solar forcing and in a control run with constant boundary conditions is consistent with reconstructions of the last two millennia, given the large uncertainty in these. Considerable spatial variations in the response to solar forcing are simulated. In particular, the changes in the Meridional Overturning Circulation provide a strong negative feedback on Northern Hemisphere surface air temperature. In the North Atlantic, the MOC changes even override the direct solar forcing, with cooling in response to enhanced solar input and vice versa.